GUIDANCE ON AIR-RELATED REQUIREMENTS FOR LANDFILLS: NEW SOURCE PERFORMANCE STANDARDS / EMISSION GUIDELINES AND OTHER SELECTED AIR ISSUES

PUBL-WA-600-00

BUREAU OF WASTE MANAGEMENT
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

May, 2000

NATURAL RESOURCES BOARD

TRYGVE A. SOLBERG, CHAIR
Minocqua

JAMES E. TIEFENTHALER Jr., VICE-CHAIR
Waukesha

Gerald M. O'Brien, SECRETARY
Stevens Point

HERBERT F. BEHNKE
Shawano

HOWARD D. POULSON
Madison

STEPHEN D. WILLETT
Phillips

DEPARTMENT OF NATURAL RESOURCES

George E. Meyer, Secretary

Darrell L. Bazzell, Deputy Secretary

Franc M. Fennessy, Executive Assistant

Division of Air and Waste
Jay G. Hochmuth, Administrator

Bureau of Waste Management
Suzanne Bangert, Director

Technical Support Section
Dennis Mack, Chief

Paul Huebner, Solid Waste Team Leader

AUTHORS

Ann Bekta, Engineer

Mark Harder, Engineer

GUIDANCE ON AIR-RELATED REQUIREMENTS FOR LANDFILLS: NEW SOURCE PERFORMANCE STANDARDS/ EMISSION GUIDELINES AND OTHER SELECTED AIR ISSUES

TABLE OF CONTENTS

I. Introduction

II. General Description of State Rules and Procedures

- A. Background
- B. Program Procedures

III. General Description of Federal Air Rules and Procedures for Landfills

- A. New Source Performance Standards (NSPS)
- B. Emission Guidelines (EG)
- C. Applicability of State and Federal Rules

IV. Comparison of State Rules and the Federal NSPS/EG

V. Other Air Requirements for Landfills
- A. Particulate Monitoring
- B. Maximum Achievable Control Technology

VI. Examples

VII. Questions and Answers

VIII. Appendices

- A. NR 504, 506 and 507 Wisconsin Administrative Code Requirements
- B. Electronic References

NOTICE: This document is intended solely as guidance, and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statues and administrative rules to the relevant facts.

I. INTRODUCTION

This guidance is directed at landfill owners, consultants, and Department staff in both the Waste and Air Management Programs. Its main purpose is to provide background and guidance on air-related landfill requirements. Consequently, we've stayed away from extended technical discussions and have made a conscious choice to cover likely scenarios, not all possible scenarios. This guidance:

- Provides a general description of the most common State and Federal air-related rules affecting landfills;
- Describes the basics of how these State and Federal rules interact, as well as the extent of the Department's authority with respect to implementing the Federal laws;
- Explains the major actions that a landfill owner must take and by when under the State and Federal rules; and
- Indicates where we believe the technical and procedural requirements of these State and Federal rules are equivalent and where they differ.

We believe that you'll find this guidance very useful, but please understand that it is not a substitute for reading applicable State and Federal rules. Regulatory decisions will be made by applying the applicable statutes and rules to the specific facts in each situation. This document is not a rule summary and you should always refer to the statutes and rules themselves.

In addition to the regulations, U.S. EPA has published a summary document that includes flow charts, timing of submittals and other useful information on the NSPS/EG. The title of the document is Municipal Solid Waste Landfills, Volume 1: Summary of the Requirements for the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills. **(http://www.epa.gov/ttn/uatw/landfill/lf-vol1.pdf)**

This guidance document was prepared by a team of DNR staff members consisting of Ann Bekta, Mark Harder and Dennis Mack of the Waste Management Program and Keith Pierce of the Air Management Program. Steve Dunn of the Air Management Program participated in early discussions. Questions about the guidance can be directed to any one of these individuals.

II. GENERAL DESCRIPTION OF STATE RULES AND PROCEDURES

A. Background

In 1988 the NR 500 series solid waste management codes were enacted. These rules include the requirement that sites not emit any hazardous air contaminant in excess of the limitations for those substances established under the authority of chapter NR 445, Wis. Adm. Code. Specifically, under s. NR 506.08(6), Wis. Adm. Code, all existing landfills which have a design capacity of greater than 500,000 cubic yards and have accepted municipal solid waste must install a department approved system to efficiently collect and combust hazardous air contaminants emitted by the landfill. Section 504.08(2), Wis. Adm. Code contains similar provisions for all new municipal solid waste landfills or expansions approved since1988.

Gas extraction systems are also installed at landfills to prevent migration of explosive gases generated by the waste fill. Chapter NR 504, Wis. Adm. Code, contains design requirements for gas extraction systems. These design requirements are more specific than the Federal New Source Performance Standards (NSPS) and Emission Guidelines (EG) requirements. Chapter IV describes changes that may be needed at a typical landfill designed to comply with ch. NR 504, Wis. Adm. Code, if the site is required to meet the Federal requirements included in the NSPS/EG.

Some of the other landfill related air quality issues that frequently generate questions are described in Chapter V.

B. Program Procedures

The following sections describe the general procedures followed by DNR Air staff in issuing Air Permits and Waste staff in issuing Waste Management Approvals.

1. Air Permitting Process

Construction Permit: Under s. 285.60(1)(a), Stats., all landfills must obtain a Construction Permit prior to beginning construction, unless the owner or operator can demonstrate that they are exempt under ch. NR 406, Wis. Adm. Code. It is unlikely that a municipal landfill or any other large landfill would be exempt. However, smaller industrial and construction and demolition sites may want to perform calculations to determine if they are exempt. The exemption levels for various pollutants are listed in s. NR 406.04(2), Wis. Adm. Code. Although other pollutants may need to be considered, the pollutant that is most likely to exceed the exemption threshold at a small industrial or construction and demolition landfills without air emission controls is particulate matter generated by truck traffic on access roads. Emission factors to calculate these emissions can be found in chapter 13.2 of "Compilation of Air Pollutant Emission Factors," AP-42, Volume 1: Stationary Point and Area Sources, U.S. EPA – OAQPS. (**http://www.epa.gov/ttn/chief/ap42c13.html**)

A Construction Permit should include all applicable air requirements. Typical air requirements for landfills address criteria pollutant emissions (particulate matter, VOC's, CO, SO_2 and NO_x), fugitive dust, hazardous air pollutants and odors. Permit conditions may include emission rate limits, testing, monitoring, record keeping and reporting. Requirements related to the federal New Source Performance Standards (NSPS) are included in the Construction Permit if applicable. Under s. 285.61(6), Stats., every Construction Permit is subject to a 30 day public comment period. The public comment period provides an opportunity for a public hearing to be requested which could cause a significant delay in

permit issuance; therefore, the Department recommends that the permit application be submitted at least six months prior to the estimated date of the start of construction. Construction Permits include an expiration date.

Operation Permit: Operation Permits are sometimes referred to as Title V permits or Part 70 permits. Title V refers to Title V of the Clean Air Act which requires the creation of the Operation Permit regulations in Part 70 of the Code of Federal Regulations (CFR). There are three types of Operation Permits: a State Only Permit (SOP), a Federally Enforceable State Operation Permit (FESOP) and a Federal Operation Permit (FOP). Contact your regional Air Program to determine what type of permit your landfill would need. The Operation Permit Program was delegated to Wisconsin in 1995. The regulations can be found in Chapter NR 407, Wis. Adm. Code.

All existing landfills, regardless of type or design capacity, should determine if they are exempt from the Wisconsin Operation Permit requirements under s. NR 407.03, Wis. Adm. Code. If a landfill is not exempt, the owner or operator should submit an Operation Permit application to the Air Management Program. The Operation Permit should include all applicable air requirements. The Operation Permit process includes an opportunity to request a public hearing during the 30-day the public comment period.

An Operation Permit may also be issued to a new or expanded landfill after the expiration of the construction permit. As stated above, a new or expanded landfill must obtain a Construction Permit prior to construction unless the owner or operator can demonstrate that they are exempt under ch. NR 406, Wis. Adm. Code After a facility has constructed and demonstrated compliance with the Construction Permit, an application for an Operation Permit that includes stack test results, etc., is submitted to the Department. The Operation Permit (when issued) contains the on-going requirements for the landfill (i.e. monitoring, record keeping and reporting). The Operation Permit requirements typically resemble the Construction Permit requirements. There is no opportunity for a second hearing in this case, because there was an opportunity for a public hearing during the Construction Permit processing. However, if the Operation Permit conditions are significantly different from the Construction Permit conditions, a second public hearing may be needed. Operation Permits typically expire in 5 years and have to be renewed. The renewal procedures allow the public an opportunity to request a hearing.

Note that there are specific submittal dates for Operation Permit applications in the Federal rules for MSW landfills. Per 40 CFR s. 62.14352(e), landfills that are subject to the EG and have a design capacity that exceeds 2.5 million cubic meters and 2.5 million megagrams, are required to submit an Operation Permit application to the Air Management Program by April 6, 2001. Per 40 CFR s. 60.752(b), landfills that are subject to the NSPS and have a design capacity that exceeds 2.5 million cubic meters and 2.5 million megagrams, are required to submit an Operation Permit application to the Air Management Program within 90 days of the date the NSPS was promulgated (March 12, 1996) or within 90 days of an increase in design capacity that exceeds the given values. These submittal dates for MSW landfills whose design capacity is above the given thresholds apply regardless of whether or not the calculated nonmethane organic compound emissions exceed 50 megagrams per year.

Construction and Operation Permits Issues for Landfills:

The Air Program usually deals with air emission sources that can be constructed, initially operated and compliance tested within an 18 month period (or less). However, landfill liner and cap construction and gas extraction and control system installation are done in a series of steps, so landfills do not fit the typical air permit process so the terms "Construction" and "Operation" can be misleading. A Construction Permit is issued for new or expanded landfills, but an Operation Permit will be in place for many of the construction events during the life of the landfill.

To try to fit landfill construction time frames into the air permit process, a Construction Permit will be issued for a landfill prior to construction of a new landfill, or an expansion (i.e., any increase in design capacity) of an existing landfill. The Construction Permit will include all aspects of the new or expanded landfill; therefore, a separate Construction Permit should not be needed as each phase is built. The Construction Permit allows construction related activities to begin and allows the gas extraction system and a specific control device to be installed. A Construction Permit may also be needed if there is a change in the control system that affects air emissions, such as the installation of an internal combustion engine if the original permit required a flare, or the installation of a second turbine when the original permit application (and Construction Permit) specified only one turbine.

Under s. 285.66(1), Stats., the default expiration time frame for a Construction Permit is 18 months unless an alternate expiration date is included as a permit condition. Because the construction of a landfill usually takes much longer than 18 months, applicants should request in the permit application that an expiration date be established that is five years from the date of the issuance of the Construction Permit. If the first phase of the landfill is completed, capped and the gas control system installed and tested before five years, an application for an Operation Permit to replace the Construction Permit should be submitted after the test data is available. The Operation Permit would include any applicable future requirements (e.g., a requirement to retest the air pollution control system after the installation of gas extraction wells in each subsequent phase). If the first phase will not be capped and have an operational gas control system within five years, an application for an Operation Permit should be submitted approximately 4 months before the expiration of the Construction Permit. The Operation Permit issued in this case may include a requirement for both an initial compliance test and the subsequent tests required as phases are closed.

If a landfill already has a gas system in an existing phase and is applying for a Construction Permit for an increase in design capacity, the expiration of the Construction Permit could be set to allow time for the existing control device to be tested. Once compliance is demonstrated, the Operation Permit application could then be submitted.

2. Landfill Siting Process

Initial Site Inspection: Under s. NR 509.04, Wis. Adm. Code, an initial site inspection (ISI) of a proposed landfill property is performed by the Department for the purpose of evaluating compliance with the applicable locational criteria and performance standards of s. NR 504.04, Wis. Adm. Code. (e.g., is the proposed site within a floodplain? Will the landfill cause a significant adverse impact on wetlands?)

Initial Site Report: Under s. NR 509.05, Wis. Adm. Code, an initial site report (ISR) is submitted after the ISI evaluation has been completed. The ISR contains a discussion of land uses at the proposed landfill location and the surrounding area as well as the regional

geotechnical information. The Department responds to the ISR with an opinion on the site's potential for development as a landfill.

Feasibility Report: Under s. NR 512.04, Wis. Adm. Code, the feasibility report is submitted after the ISR opinion is given. The report contains general facility information, land use information, site-specific geotechnical information, a subsurface data analysis, waste and leachate characterizations, and a proposed preliminary design. The feasibility report contains the applicant's proposed design capacity for the landfill. The feasibility determination includes an approved maximum design capacity.

Plan of Operation Report: Under s. NR 514.04, Wis. Adm. Code, the plan of operation report is typically submitted by the applicant after receiving a favorable feasibility determination from the Department. The plan of operation includes specific design and operational criteria for the proposed landfill. The design capacity specified in the feasibility determination may be reduced in the plan of operation but would not be increased. Under s. NR 500.03(77), Wis. Adm. Code, an increase in design capacity is considered an expansion and would require going through the entire siting process again. The plan of operation contains the gas extraction system design and (at a minimum) mentions the proposed method of control (e.g., enclosed flare, internal combustion engine, etc.). Under s. NR 504.08(2), Wis. Adm. Code, all new or expanded municipal solid waste landfills must install a department approved system to efficiently collect and combust hazardous air contaminants emitted by the landfill. If the plan of operation report satisfies the applicable regulations, the Department responds by issuing a plan of operation approval.

Construction Documentation Report: Under s. NR 514.04(1), Wis. Adm. Code, site construction can begin upon receiving the plan of operation approval. Under ch. NR 516, Wis. Adm. Code, a construction documentation report is submitted for approval upon completion of construction of each phase of liner and cap to show compliance with the plan of operation (and any subsequent approved modifications) and the solid waste management code.

License Issuance: Under ch. 520, Wis. Adm. Code, after the Department has approved the initial construction documentation for the liner of a new landfill, the owner or operator submits proof of financial responsibility for closure and long-term care. When the financial submittal is approved by the Waste Management Program, a license is issued and waste disposal may begin at the site.

III. GENERAL DESCRIPTION OF FEDERAL AIR RULES AND PROCEDURES FOR LANDFILLS

A. New Source Performance Standards

New Source Performance Standards (NSPS) are Federal regulations for specific types of industry (e.g., pulp and paper mills, electric utility boilers, landfills). As the name implies, NSPS are applicable to newer facilities and expansions of existing sites. The Department is required by the Wisconsin Statutes to adopt the Federal NSPS requirements into the Wisconsin Administrative Code (as of the date of this guidance the Department has not yet adopted the Federal regulations). The applicable NSPS requirements are included in air permits and are in addition to all of the other air requirements.

A municipal waste landfill or MSW landfill is defined in 40 CFR s. 60.751 to be "an entire disposal facility in a contiguous geographical space where household waste is placed in or on land... portions of a MSW landfill may be separated by access roads...an MSW landfill may be a new MSW landfill, an existing MSW landfill or a lateral expansion." Typically, landfills on the same property have different license numbers and are treated as separate landfills by the Waste Management Program. However, for the NSPS/EG regulations, **all** landfills that contain MSW and are located on contiguous and/or adjacent property are treated as **one** MSW landfill.

The landfill NSPS applies to all MSW landfills that commence construction or modification on or after May 30, 1991. 40 CFR s. 60.2 states that: "Commenced means, with respect to the definition of *new source* in section 111(a)(2) of the Act, that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification." Note that for the MSW landfill NSPS/EG a modification is defined as "an increase in the permitted volume design capacity of the landfill by either horizontal or vertical expansion based on its permitted design capacity as of May 30, 1991" (40 CFR s. 60.751).

All owners or operators of MSW landfills who commenced construction of a new landfill or an expansion of an existing landfill which was approved on or after May 30, 1991 are **subject** to the NSPS (40 CFR s. 60.750(a)). Once **subject** to an NSPS, the owner or operator is required to submit the initial design capacity report to the Department's Air Management Program and U.S. EPA (40 CFR s. 60.752(a)) within 90 days. If the design capacity exceeds 2.5 million megagrams (Mg) and 2.5 million cubic meters (M^3), then the emission rate of non-methane organic compounds (NMOC) is calculated using Tier I, Tier II, or Tier III, as appropriate, to determine what parts of the NSPS requirements a facility must meet (40 CFR s. 60.752(b)). If it can be demonstrate that the emission rate is less than 50 megagrams (55 tons) of NMOC per year (through methods described in the rule), then the owner or operator is only required to periodically calculate and report the emission rate. However, if the calculated emission rate meets or exceeds 50 megagrams per year, then the owner or operator is required to comply with the other requirements of the NSPS, such as surface monitoring, recordkeeping and reporting (40 CFR s. 60.752(b)(2)). It is important that landfill owners and operators realize the distinction between being subject to the NSPS and being required to meet all the provisions of the NSPS.

The Air Management Program has the authority to include NSPS requirements in permits even before the NSPS is incorporated into the Wisconsin Administrative Code. However, prior to promulgation, if an owner or operator wants to request an alternative compliance method or other changes to the NSPS requirements they must get approval from U.S. EPA.

B. Emission Guidelines

The Emission Guidelines (EG) are Federal requirements for certain types of industry. The landfill EG requirements are essentially identical to the NSPS requirements except for the applicability dates. The landfill EG apply to facilities that accepted MSW on or after November 8, 1987 and last commenced construction before May 30, 1991 (40 CFR s. 62.14352(a)). Note that "commenced construction" for the EG is defined the same as in the NSPS (40 CFR s. 60.2). Like the NSPS, an initial design capacity report is submitted and if the design capacity exceeds 2.5 million Mg and 2.5 million M^3, then the 50 megagram of NMOC per year calculation is used to determine what requirements of the EG a facility must meet. Note that if the facility accepted waste on or after November 8, 1987, but also commenced construction of a modification (i.e., an increase in design capacity) on or after May 30, 1991, then NSPS requirements would replace the EG requirements.

The Federal EG Plan was promulgated on November 8, 1999 and has an effective date of January 7, 2000. The Air Management Program is seeking delegation of the Federal EG program from U.S. EPA. Even if the delegation is granted, EPA concurrence will likely be needed to approve alternative compliance methods or other variations allowed by the EG language. The State may be able to obtain EPA concurrence through the Air permit processing procedures used for each individual facility.

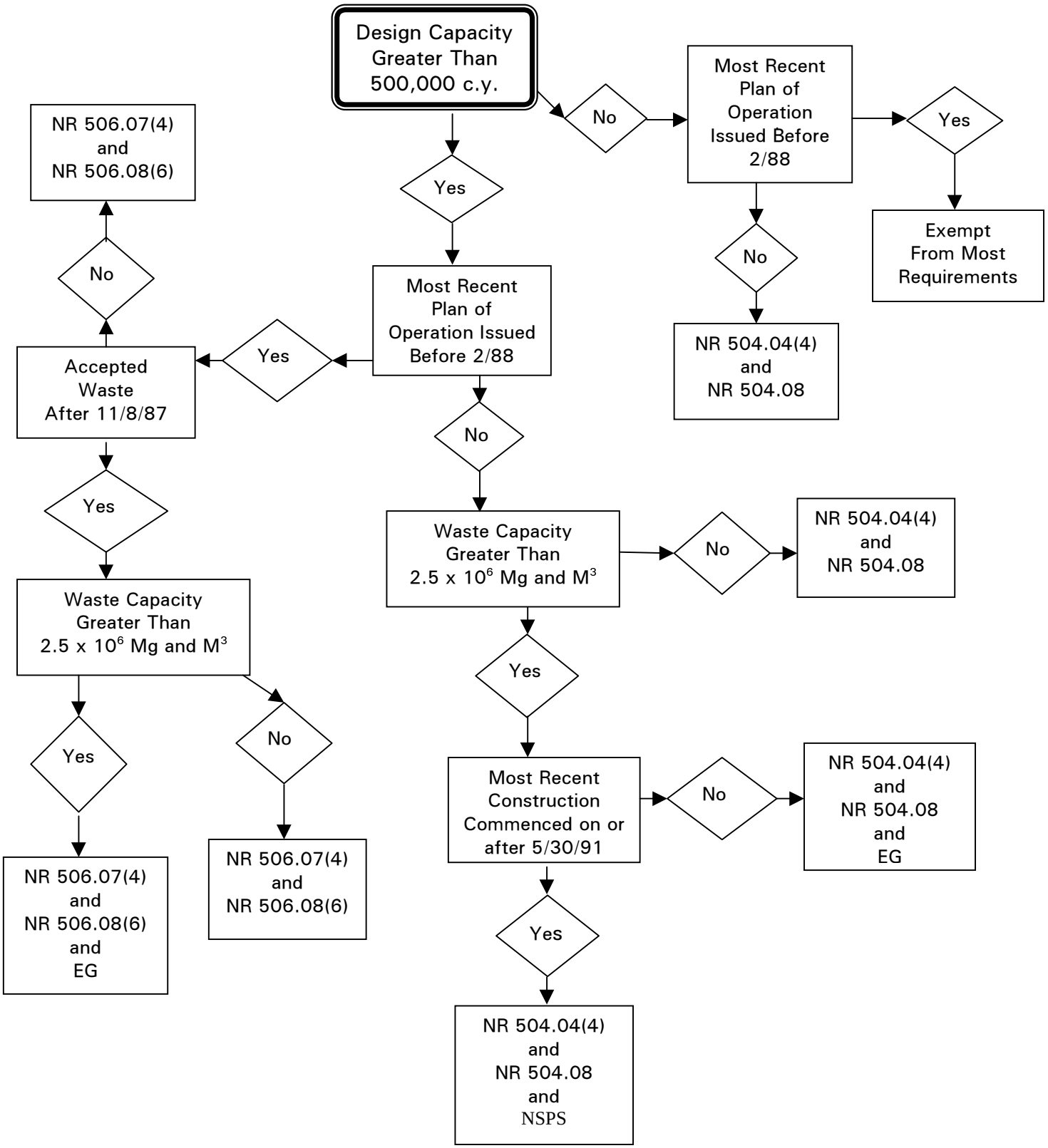
C. Applicability

Chapters NR 504 and NR 506 of the Wisconsin Administrative Code contain certain requirements for landfill gas collection and control systems based on landfill design capacity and the date of the most recent plan of operation approval. The Emission Guidelines (EG) and New Source Performance Standards (NSPS) also contain landfill gas collection and control requirements and apply to municipal solid waste landfills based on design capacity and specific dates.

The following flowchart can help to determine what specific NR 500 series and Federal requirements apply to your landfill. You should refer to the specific regulations to determine if a gas system is needed for your landfill, as well as any applicable performance specifications and design requirements. Please note that the flowchart addresses the regulations that may affect the design, operation and/or reporting requirements for an active gas collection and control system at MSW landfills. The flow chart does not address all provisions of the State and Federal regulations applicable to MSW landfills. This flowchart should be used as guidance only. The specific regulations will be used in making regulatory decisions in all cases.

APPLICABLITY FLOWCHART

(All sites are subject to ch. NR 504 performance standards, ch. NR 507 monitoring requirements and any conditions of approval)



IV. COMPARISON OF STATE RULES AND FEDERAL NSPS/EG

Collection and control systems for landfill gas have been required by Wisconsin regulations for over 10 years, so many requirements of the NSPS and EG are already being met by Wisconsin landfills. The following sections identify changes that may be needed at a landfill when (or if) the site ever becomes subject to all of the requirements of the NSPS/EG (i.e., the emission rate of NMOC is demonstrated to be 50 megagrams per year, or more). This chapter assumes that the site is in compliance (or, for a new site, will comply) with the applicable requirements of chs. NR 500 to 538, Wis. Adm. Code.

The NSPS contains gas system design standards, operational criteria and performance standards throughout the regulations. In this chapter, we list and describe the NSPS/EG requirements and have grouped them as gas extraction system design, control system design, performance standards and monitoring, reporting, and recordkeeping. This chapter illustrates what a landfill would have to do differently from the current NR 500 series regulations, if they were subject to all of the NSPS/EG requirements, and documents what current State landfill requirements the Department believes satisfy certain NSPS/EG requirements. This chapter is written assuming the landfill will have a typical active gas extraction system and flare design.

In the following sections we list the Federal requirements from 40 CFR Part 60 along with an explanation of how the requirement relates to typical State Waste Management requirements. As you may know, Ch. NR 504, Wis. Adm. Code contains design standards for gas extraction systems as well as performance standards addressing landfill gas migration and hazardous air contaminant control. The performance criteria of the NSPS/EG are different than the performance standards of the NR 500 series. Specifically, under the NSPS/EG the performance of the gas collection system is demonstrated by maintaining the methane concentration at the surface of the landfill at a level that is less than 500 ppm above the background concentration (40 CFR s. 60.753(d)). The gas extraction system design standards in s. NR 504.08, Wis. Adm. Code were established based on empirical information and best engineering judgment. The Department expects that many landfills will be able to meet the NSPS/EG requirements using the State design standards. However, the Department currently has no data on whether or not all landfills that comply with ch. NR 504, Wis. Adm. Code, will be also able to meet the NSPS/EG surface monitoring requirement.

A. Gas Extraction System Design

- ***S. 60.752(b)(2)(ii)(A) An active collection system shall:***

  (1) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment.

  (2) (See below)

  (3) Collect gas at a sufficient extraction rate.

  (4) Be designed to minimize off-site migration of subsurface gas.

  These are general performance standards that a well designed gas extraction system should be able to meet. Compliance with the performance standards and design criteria in ch. NR

504, Wis. Adm. Code, and most approvals issued by the Waste Management Program should satisfy these general standards.

Note that (2) relates to timing of installation of the gas extraction system and will be addressed in section C. Performance Standards and Monitoring of the Gas Extraction System.

- ***S. 60.756(a) Each owner or operator seeking to comply with S. 60.752(b)(2)(ii)(A) for an active gas collection system shall install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each well head…***

  Chapter NR 504, Wis. Adm. Code, does not specifically require an access port for temperature monitoring or a thermometer, but current approvals typically require monitoring of the gas temperature at the well head. Sites with older approved gas extraction systems may need to modify their well heads to comply with the Federal requirements.

- ***S. 60.759(a) Each owner or operator seeking to comply with s. 60.752(b)(2)(i) shall site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas …***

  (1) The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depth of refuse, refuse gas generation rates, …

  (2) The sufficient density of gas collection devices …shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

  (3) The placement of the gas collection devices … shall control all gas producing areas …

  The certification requirement described in (1) is not included in the NR 500 series. It is suggested that language similar to s. NR 516.04(3)(d), Wis. Adm. Code be used as a guide to meet this requirement. The issues listed in (1) that are to be considered in the design are standard design items that are addressed by chapter NR 504, Wis. Adm. Code.

  Section NR 504.08, Wis. Adm. Code requires gas extraction wells to be designed to prevent migration of explosive gases generated by the landfill. Gas extraction wells are required to be located throughout the entire landfill with a maximum radius of influence of 150 feet, an overlap of the radius of influence, and a smaller well spacing at the perimeter. In most cases, no additional actions should be needed to meet (2) and (3) of the Federal requirements shown above. However, as stated previously, to demonstrate compliance with the NSPS/EG an owner or operator must demonstrate that the methane concentration at the landfill surface does not exceed 500 ppm above the background concentration. The design requirements of s. NR 504.08, Wis. Adm. Code should be considered a minimum, and do not assure compliance with the NSPS/EG for all sites.

- ***S. 60.759(b) Each owner or operator seeking to comply with s. 60.752(b)(2)(i)(A) shall construct the gas collection devices using the following equipment or procedures:***

(1) The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel…

(2) Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill…

(3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access, couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

Chapter NR 504, Wis. Adm. Code and current design practices should address the requirements in (1), (2) and most of (3) above. The requirement for at least one sampling port in the connector assembly may not be standard practice and existing gas extraction wells may need to be retrofitted.

- ***S. 60.759(c) Each owner or operator seeking to comply with s. 60.752(b)(2)(i)(A) shall convey the landfill gas to a control system in compliance with s. 60.752(b)(2)(iii) through the collection header pipe(s). The gas mover equipment shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures …***

  This section refers to a calculation given in the NSPS to estimate the gas generation rate which is used to size the blower. Chapter NR 504, Wis. Adm. Code, requires that a minimum of 10 inches of water column be available in the header adjacent to the wells located furthest from the blower. The ch. NR 504, Wis. Adm. Code and NSPS/EG requirements are not identical. If a facility is required to meet this section of the NSPS/EG, then both requirements must be met.

B. Control System Design

The NR 500 series includes requirements that hazardous air pollutant emissions not exceed the applicable limits established in ch. NR 445, Wis. Adm. Code. Typically, a control device (flare) is used to meet this requirement. Waste Management Program approvals usually do not specifically address the design, testing or monitoring of the control device. The application for permits from the Air Management Program should address the requirements applicable to the type of control device the owner or operator has chosen to use. The requirements of ch. NR 445, Wis. Adm. Code for the control device are not the same as the requirements of the NSPS/EG. Since the NR 500 series has no specific design requirements for control devices, the following explanations will address the differences between ch. NR 445, Wis. Adm. Code and the NSPS/EG.

- ***S. 60.752(b)(2)(iii) Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii)(A), (B) or (C) of this section.***

  (A) An open flare designed and operated in accordance with s. 60.18;

  (B) A control system designed and operated to reduce NMOC by 98 weight percent, or, when an enclosed combustion device is used for control to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial

performance test no later than 180 days after start-up of controls using the test methods specified in s. 60.754(d).

(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of paragraph (b)(2)(iii)(A) or (B) of this section.

Many facilities that are subject to the hazardous air pollutant BACT or LAER likely already comply with (or exceed) the NSPS/EG requirements described above. If a control device that is not subject to BACT or LAER system is in use, the owner or operator should check any Air Permit or Administrative Order that may have been issued for the landfill to determine if the NSPS/EG requirements can be met by the existing equipment. A permit or order will likely have requirements in the same general categories as described for BACT and LAER (i.e., Operating Temperature/Retention time, Operating requirements, Emission testing, Required destruction efficiency and Reporting requirements) but the specific limitations within those categories will likely be less stringent than those required for BACT or LAER.

Note that if a stack test if required under ch. NR 445, Wis. Adm. Code or other Air regulations, the open flare design described in (A) may be more difficult to test than an enclosed flare. The performance requirements for enclosed flares and other control systems, such as engines for electricity generation, are included in (B).

- ***S. 60.753 Operational standards for collection and control systems.***

(e) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with s. 60.752(b)(2)(iii).

(f) Operate the control or treatment system at all times when the collected gas is routed to the system.

The design of the control system referenced in (e) is described in the previous section.

The requirement in (f) ties in with the NSPS/EG annual reporting requirement. The owner or operator (if subject to all provisions of the NSPS/EG) is required to submit an annual report that includes the amount of time the control system was by-passed or inoperable.

All landfills with control devices are subject to the general notification of malfunctions and unscheduled events under s. NR 439.03, Wis. Adm. Code and/or a facility malfunction prevention and abatement plan per s. NR 439.11, Wis. Adm. Code. In general, ch. NR 439, Wis. Adm. Code requires an owner or operator to report to Air Management any malfunction or unscheduled event that results in an exceedance of an applicable limit the next business day following the event. Records of the event are required to be kept by s. NR 439.04(1)(b), Wis. Adm. Code.

C. Performance Standards and Monitoring of the Gas Extraction System

- ***S. 60.753 Operational standards for collection and control systems.***

(a) Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:

(1) 5 years or more if active; or
(2) 2 years or more if closed or at a final grade

(b) Operate the collection system with negative pressure at each wellhead...

(c) Operate each interior wellhead in the collection system with a landfill gas temperature less than 55° C and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent....

(d) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill....

(e) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with s 60.752(b)(2)(iii)...

(f) Operate the control or treatment system at all times when the collected gas is routed to the system.

(g) If monitoring demonstrates that the operational requirements in paragraphs (b), (c), or (d) of this section are not met, corrective action shall be taken...

Section NR 514.07(3)(c), Wis. Adm. Code requires that active gas extraction system be installed and made operational when final grades are attained in each phase. For landfills required to comply with this part of the NSPS, (a) requires a gas system to be installed prior to closure if the earliest waste in an area has been in place 5 years or more. These areas must be controlled by the installation of a gas collection system, even though waste is still being actively deposited.

Waste Management Approvals generally require monthly monitoring of pressure, temperature and oxygen and/or nitrogen; however, specific limits for these parameters are not included and test methods are not specified. The Federal requirements in (b) and (c) establish specific limits for monitored parameters. Test methods and monitoring equipment with a specific accuracy are required by 40 CFR ss. 60.754 and 60.756. The specific limits and test methods, along with time frames in which exceedances of the standards in (b), (c) and (d) must be corrected, should be included in the Air permit application submitted by the landfill owner or operator.

The surface methane concentration limit in (d) is not currently addressed in the NR 500 series. The methane concentration limit in (d), procedures for the surface monitoring described in s. 60.755(c) and the specifications for the meter that is to be used described in s. 60.755(d), should be addressed in the Air permit. In general, s. 60.755(c) requires a determination of the background methane concentration and then monitoring the methane surface concentration around the perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals.

Section (e) and (f) of the Federal requirements were described in the previous section on the control system design.

As stated previously, the specific limits for temperature, oxygen and nitrogen concentrations, and surface methane concentrations are not included in the NR 500 series. Section (g) refers to the corrective actions to be taken in the event of an exceedance and the corresponding time frame requirements which will be addressed in the Air permit. Section 60.755 of the Federal regulations describes the actions an owner or operator must take to correct an exceedance of a specific limit established by the NSPS/EG. For example, if the gas temperature limit of 55°C is exceeded,

corrective actions must be started within 5 calendar days and the exceedance corrected within 15 calendar days. If the exceedance cannot be corrected, the gas system must be "expanded" within 120 days of the initial exceedance.

D. Reporting

- ***S. 60.757(a) Each owner or operator subject to the requirements of this subpart shall submit an initial design capacity report to the Administrator.***

  (1) The initial design capacity report … shall be submitted no later than:

  (i) June 10, 1996, for landfills that commenced construction, modification or reconstruction on or after May 30, 1991 but before March 12, 1996 or

  (ii) Ninety days after the date of commenced construction, modification, or reconstruction on or after March 12, 1996.

  (2) The initial design capacity report shall contain the following information:

  (i) A map or plot of the landfill, providing the size and location of the landfill, and identifying all areas where solid waste may be landfilled …

  (ii) The maximum design capacity of the landfill. Where the maximum design capacity is specified in the permit issued by the State, local or tribal agency responsible for regulating the landfill, a copy of the permit specifying the maximum design capacity may be submitted as part of the report…

  (3) An amended design capacity report shall be submitted to the Administrator providing notification of an increase in the design capacity of the landfill, within 90 days of an increase in the maximum design capacity of the landfill to or above 2.5 million megagrams and 2.5 million cubic meters. This increase in design capacity may result from an increase in the permitted volume of the landfill or an increase in the density as documented in the annual recalculation required in s. 60.758(f).

Under ch. NR 512. Wis. Adm. Code, the design capacity is established in the Waste Management Program approval of feasibility reports. There is no analogous requirement in the NR 500 series to notify Air Management of the design capacity as required by (1) and (2) of the Federal rule.

The Department sent a letter dated May 31, 1996 requesting design capacity report information from landfills that had expanded on or after May 30, 1991 and had a design capacity greater than 2.5 million cubic meters, so the requirements of (1) and (2) may have been met by those landfills. Landfills subject to the EG will also have to submit an initial report by April 6, 2000 as stated in the Federal Plan promulgated on November 8, 1999.

Please be aware that the definition of design capacity in the Federal rule is not the same as the definition in the NR 500 series. The Federal rule refers to in-place waste, and the State definition refers to in-place waste plus daily and intermediate cover (see s. NR 500.03(58), Wis. Adm. Code). Therefore, the design capacity report submitted to Air Management under the Federal regulations should include the design capacity established in the Plan of Operation, less the estimated and/or actual amount of clean soil used as daily and intermediate cover. Daily cover volume is calculated from an estimated ratio of waste to daily cover for a proposed landfill or from actual usage records at an existing landfill. The ratio will be a site specific value that is typically included in the

Feasibility Report. Waste streams used as daily cover (e.g., shredder fluff, foundry sand, bio-soils) are considered as waste when determining the design capacity for the NSPS/EG.

To satisfy the content requirement in (2), the owner or operator may submit a cover letter that references the plans submitted in the Plan of Operation report and the date the Plan of Operation Approval was issued. A copy of the part of the Waste Management Approval that includes the condition that limits the maximum design capacity, and the calculation subtracting non-waste daily and intermediate cover volume from the State Waste Management design capacity should also be included. The waste to daily cover ratio should be shown and an explanation should be included if the ratio is not the same as the one used in the Feasibility report.

New and existing landfills that expand after May 30, 1991 must submit either an initial or amended design capacity report, as appropriate, to Air Management within 90 days of the start of construction. Note that the Construction Permit application for a new or expanded landfill will also include the design capacity.

State Waste Management Approvals typically use volume for design capacity rather than mass. Section 60.758(f) referred to in (3) above includes the requirement to annually determine the site-specific density. Record keeping and reporting are also required to document the conversion from volume to mass, if an owner or operator chooses to pursue this option. Wisconsin facilities have design capacity values established in approvals and tonnage records so it is unlikely that an annual determination of site-specific density will be needed.

- ***S. 60.757(b) Each owner or operator subject to the requirements of this subpart shall submit an NMOC emission rate report to the Administrator initially and annually thereafter,*** **...**

  (1) The NMOC emission rate report shall contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures provided in s. 60.754(a) or (b), as applicable.

  (i) The initial NMOC emission rate report may be combined with the initial design capacity report required in paragraph (a) of this section and shall be submitted no later than indicated in paragraphs (b)(1)(i)(A) and (B) of this section. Subsequent NMOC emission rate reports shall be submitted annually thereafter, except as provided for in paragraphs (b)(1)(ii) and (b)(3) of this section.

  (A) June 10, 1996, for landfills that commenced construction, modification, or reconstruction on or after May 30, 1991, but before March 12, 1996, or

  (B) Ninety days after the date of commenced construction, modification, or reconstruction for landfills that commenced construction, modification, or reconstruction on or after March 12, 1996.

  (ii) If the estimated NMOC emission rate as reported in the annual report to the Administrator is less than 50 megagrams per year in each of the next five years, the owner or operator may elect to submit an estimate of the NMOC emission rate for the next 5 year period in lieu of the annual report. This estimate shall include **...**

There are no reporting requirements in the NR 500 series based on NMOC emission rates. This section of the Federal rules essentially requires MSW landfills that meet the applicable date and size

criteria of the NSPS or EG to submit an annual estimate of NMOC emissions based on a calculation provided in the NSPS (referred to as Tier 1 in the Federal rule). If certain conditions are met, the facilities can elect to submit emission estimate reports every five years. Facilities also can elect to calculate the NMOC emission rate using site specific criteria (referred to as Tier 2 and Tier 3).

The NMOC emission estimate should include the entire site. For example, if there are one or more older landfills located on the same or adjacent property, the older landfills should be included in the emission estimate along with the new or proposed landfill.

If an owner or operator establishes that the facility NMOC emission rate is 50 megagrams per year or more, then the annual (or five year estimate) submittal is no longer required. However, numerous other NSPS/EG requirements will apply after the emission threshold is met or exceeded.

- ***S. 60.757(c) Each owner or operator subject to the provisions of s. 60.752(b)(2)(i)shall submit a collection and control system design plan to the Administrator within 1 year of the first report … in which the emission rate exceeds 50 megagrams per year, except as follows:***

Under State rules, a design for the gas collection system is included in the landfill Plan of Operation. An owner or operator could refer to the Plan of Operation report and Waste Approval of the Plan of Operation (and any subsequent modification) in the submittal to the Air Management Program, rather than copying the material. The control device usually is not completely described in the Plan of Operation submittal, so that information (that is also needed for the air permit application) should be sent to the Air Management Program. If upgrading of the collection system is determined to be necessary to meet the NSPS/EG requirements, a proposed plan modification should be submitted to the Waste Management Program. If the control system improvements are necessary to meet the NSPS/EG, contact the Air Program to determine proper the procedure.

If the proposed landfill is located on the same or adjacent property as an older landfill without gas extraction or with an inadequate existing gas system, a gas collection system design for the older landfill should be included if the NMOC emission rate from the entire site is determined to be 50 megagrams per year or more.

- ***S. 60.757(d) Each owner or operator of a controlled landfill shall submit a closure report to the Administrator within 30 days of waste acceptance cessation… no additional wastes may be placed in to the landfill without filing a notification of modification as described under s. 60.7(a)(4).***

Section NR 506.08, Wis. Adm. Code, includes a series of closure requirements beginning at least 120 days prior to closure. The Department suggests that a letter be sent to Air Management that documents the closure date and refers to the submittal to the Waste Management Program that addresses the requirements of s. NR 506.08, Wis. Adm. Code and any site specific requirements in any approvals issued to the landfill.

- ***S. 60.757(e) Each owner or operator of a controlled landfill shall submit an equipment removal report to the Administrator 30 days prior to removal or cessation of operation of the control equipment.***

The NSPS/EG allows the gas collection and extraction system to be removed after 15 years if the criteria in 40 CFR s. 60.752(b)(2)(v) are met. However, under s. 289.41, Stats., landfills must

provide proof of financial responsibility for long-term care for at least 40 years. The responsibility to maintain a gas system continues indefinitely after that. Removal of the gas system as allowed under the Federal criteria may violate the State landfill regulations. However, if the Federal criteria are met, an owner or operator could request that the NSPS/EG monitoring, record keeping and reporting requirements be removed from their Air permit. If approved, the gas extraction and control systems would continue to operate under the requirements of the NR 500 series.

- ***S. 60.757(f) Each owner or operator of a landfill seeking to comply with s. 60.752(b)(2) using an active collection system designed in accordance with s. 60.752(b)(2)(ii) shall submit to the Administrator annual reports of the recorded information in (f)(1) through (f)(6) of this paragraph. The initial annual report shall be submitted within 180 days of installation and start-up of the collection and control system, and shall include the initial performance test report required under s. 60.8.***

    (1) Value and length of time for exceedances of applicable parameters monitored under s. 60.756(a), (b), (c) and (d).

    (2) Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of a bypass flow as specified under s. 60.756.

    (3) Description and duration of all periods when the control device was not operating for a period exceeding 1 hour and the length of time the control device was not operating.

    (4) All periods when the collection system was not operating in excess of 5 days.

    (5) The location of each exceedance of the 500 part per million methane concentration as provided in s. 60.753(d) and the concentration recorded in the previous month.

    (6) The date of installation and the location of each well or collection system expansion added pursuant to paragraphs (a)(3), (b), and (c)(4) of s. 60.755.

Monitoring data is submitted to the Waste Management Program in accordance with s. NR 507.26, Wis. Adm. Code. There is no specific requirement in the NR 500 series for an annual report; however, some sites may have an annual report requirement due to site specific issues. The Federal regulations in 40 CFR s. 60.757(f) require an owner or operator to submit an annual report to EPA and a copy should be sent to the Air Management Program. The items to be reported are listed in (f)(1) through (f)(6) and are self explanatory. The Department suggests that a copy of the annual report be kept in the written operating record for the landfill described in s. NR 506.17, Wis. Adm. Code.

The only overlap with the Waste Management requirements is in (6). The installation of additional gas wells could be required by the Air Management Program. The additional gas wells could be approved by the Waste Management Program as an expedited plan modification under s. NR 514.09, Wis. Adm. Code, if the gas extraction well design is similar to the other approved extraction wells at the site. Section NR 507.14, Wis. Adm. Code, requires well information forms and boring logs for the installation of extraction wells either in a report (e.g., Construction Documentation Report) or within 60 days of installation. Before an additional well is installed, the

landfill owner or operator should meet with Air and Waste Management staff to be sure that the installation of an additional well is an appropriate action to address the problem. As mentioned previously, the Federal regulations include specific time frames in which the gas system must be "expanded" to correct an exceedance of a monitored parameter. The set time frames are a significant difference from typical Waste Management Program procedures.

- ***S. 60.757(g) Each owner or operator seeking to comply with s. 60.752(b)(2)(iii) shall include the following information with the initial performance test report required under s. 60.8:***

    (1) A diagram of the collection system showing…

    (2) The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;

    (3) The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded …

    (4) The sum of the gas generation flow rates for all areas from which collection wells have been excluded …

    (5) The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and

    (6) The provisions for the control of off-site migration.

Various plan sheets showing the gas system layout are submitted to the Waste Management Program during the approval process. To comply with (1) an owner or operator could refer to submittals made, rather than sending an additional copy. A signed statement that the previously submitted information has not changed should also be included.

A maximum radius of influence for each extraction well is included in ch. NR 504, Wis. Adm. Code or would be addressed in the Plan of Operation Report if the gas extraction well uses a non-typical design. The data for sizing the blower is also included in the Plan of Operation Report. If the Report does not include a gas generation estimate as described in the NSPS/EG, then this calculation should be included with the initial performance test report. To comply with (2), a reference to previous submittals to the Waste Management Program, and an associated signed statement that the information is still current, could be made rather than sending copies of the other material.

The Waste Management Program requires that all areas of the landfill be controlled (s. NR 504.08(2), Wis. Adm. Code). Facilities that accept asbestos record the location so a well will not be located at that specific point; however, the area will likely be within the radius of influence of a well. Facilities do not typically locate asbestos and nondegradable waste in one large area, so it is unlikely that (3) and (4) will be applicable.

The sizing of the gas mover equipment is included in the Plan of Operation Approval issued by the Waste Management Program and can be referenced (as described previously) by the owner or operator to comply with (5).

Typically, the Waste Management Approvals establish criteria for construction materials, techniques and control systems that are intended to control gas migration and protect groundwater. An owner or operator could refer to their Waste Management Approval documents to comply with (6).

E. Recordkeeping requirements

- ***S. 60.758 Recordkeeping***

(a) Except as provided for in s. 60.752(b)(2)(i)(B), each owner or operator of a MSW landfill subject to the provisions of s. 60.752(b) shall keep for at least 5 years up to date, readily accessible, on-site records of the maximum design capacity report which triggered s. 60.752(b), the current amount of solid waste in place, and the year by year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

The Waste Management Program requires an annual tonnage report which includes the amount of waste in place and the yearly acceptance rate (s. NR 520.14(3), Wis. Adm. Code). Annual tonnage reports are required to be kept in the written landfill operating record described in s. NR 506.17, Wis. Adm. Code. The design capacity report using the Federal definition of design capacity is not a Waste Management requirement, so the maintenance of that report is a new procedure. In addition, the specific location and the ability to access records are not as prescriptive in the NR 500 series.

(b) Except as provided for in s. 60.752(b)(2)(i)(B), each owner or operator of a controlled landfill shall keep up to date readily accessible record for the life of the control equipment of the data listed in paragraphs (b)(1) through (b)(4) of this section as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal.

The records required under this paragraph are essentially the gas collection and control system design calculations and the performance test results. Some of the design calculations may be included in the Plan of Operation report, which landfills are required to maintain for the life of the site plus an additional 40 years (s. NR 506.17, Wis. Adm. Code). The monitoring of the control device during performance tests is not included in Waste Management Approvals, but is included in Air permits.

(c) Except as provided for in s. 60.752(b)(2)(i)(B), each owner or operator of a controlled landfill subject to the provisions of this subpart shall keep for 5 years up-date-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in s. 60.756 as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.

The records required under this paragraph are the results of monitoring the gas extraction wells for temperature, pressure and oxygen or nitrogen and the flow rate to the control device and any bypass. Monitoring and reporting of most of these parameters are typically included in Waste Management Approvals. Maintaining the results for 5 years and the exceedance tracking (which is needed for the annual report required by s. 60.757(f)) are requirements that are not typically included in Waste Management Approvals.

> ***(d) Except as provided for in s. 60.752(b)(2)(i)(B), each owner or operator subject to the provisions of this subpart shall keep for the life of the collection system an up-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector.***

This information is included in the Plan of Operation report and Construction Documentation report and is required to be maintained for the life of the facility plus an additional 40 years (s. NR 506.17, Wis. Adm. Code).

> ***(e) Except as provided for in s. 60.752(b)(2)(i)(B), each owner or operator subject to the provisions of this subpart shall keep for 5 years up-date, readily accessible records of all collection and control system exceedance of the operational standards in s. 60.753, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.***

This paragraph refers to records kept for the surface monitoring. Since surface monitoring is not an NR 500 series requirement, this recordkeeping requirement is not in Waste Management Approvals. Note that the data from this record is included in the annual report required by s. 60.757(f).

> ***(f) Landfill owners or operators who convert design capacity from volume to mass or mass to volume to demonstrate that landfill design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, as provided in the definition of "design capacity", shall keep readily accessible, on-site records of the annual recalculation of site-specific density, design capacity, and the supporting documentation…***

As mentioned previously, most landfills establish their design capacity in units of volume and report annual tonnage and volume numbers to the Department. Since landfills in Wisconsin have tonnage records and approvals that establish the design capacity in units of volume, it is unlikely that this section will be used.

V. OTHER AIR REQUIREMENTS FOR LANDFILLS

A. Particulate Monitoring

Total Suspended Particulate (TSP) monitoring is typically required on a case-by-case basis for proposed landfills and expansions of existing landfills. Air monitoring is specified under the provisions of s. NR 507.24, Wis. Adm. Code. Decisions regarding whether TSP monitoring will be required, the number of monitors, the length of the monitoring period, etc., are made by the Department's Air Management Program. In general, landfills with total design capacities greater than 500,000 yd^3 have been required to install 1 TSP monitor and those over 2,000,000 yd^3 have been required to install 2 monitors. Monitoring is typically required to begin with the start of landfill construction and continue for a minimum of 2 years or for two years after having monitored an exceedance of the secondary TSP standards.

Until approximately the mid-1990s, such case specific requirements were contained in a landfill's Feasibility or Plan of Operation Approval issued by the Waste Management Program. However, they are now included as part of the Construction Permit issued by the Air Management Program for all new landfills or expansions, or the Operation Permit for existing landfills.

B. Maximum Achievable Control Technology (MACT)

Separate from the NSPS/EG promulgated in 1996, EPA is currently developing additional federal rules that will be applied to larger MSW landfills that emit or are capable of emitting significant quantities of hazardous air pollutants (HAPs). EPA began work on these rules roughly two years ago and expects to complete them in approximately mid-2001.

The rules, which are required under Section 112 of the Clean Air Act (as opposed to Section 111 for the NSPS/EG), require EPA to establish something called Maximum Achievable Control Technology (MACT). Three types of HAP emissions from MSW landfills are being investigated: landfill gas emissions, leachate emissions, and emissions from petroleum contaminated soil used as daily cover. One or more MACTs may be established to control these three emission types.

One of the early steps that EPA must take in developing a MACT, is the specification of a Presumptive MACT, or PMACT. The PMACT is essentially an educated guess on what the MACT will ultimately be once a more thorough evaluation is performed. EPA has completed this step and established the PMACT for landfill gas emissions as the NSPS/EG requirements. For leachate emissions and emissions from petroleum contaminated soil used as daily cover, they have determined that the PMACT is "no control". If these ultimately become the final MSW landfill MACT, the rule would have little effect on landfills beyond the NSPS/EG requirements already imposed. However, this could change as additional data is obtained and evaluated. You can follow EPA's progress directly at http://www.epa.gov/ttn/uatw/landfill/rdlandfl.html.

VI. EXAMPLES

These examples are provided for the purpose of illustration only. Specific choices are made by the hypothetical owner or operator which should not be construed as regulatory requirements.

A. MSW Landfill subject to ch. NR 506 and EG

Scenario: Site A commenced construction of a 4 million cubic yard landfill on January 13, 1985 and stopped accepting waste on March 4, 1995. The cap and the gas collection and control system were installed during the 1995 construction season. Note that the gas system was installed per Wisconsin requirements for the control of landfill gas migration and hazardous air pollutants.

Analysis: The landfill last commenced construction prior to May 30, 1991 so the EG (rather than the NSPS) is the appropriate rule. The landfill accepted waste after November 8, 1987 and has a design capacity that exceeds 2.5 million cubic meters (3.27 million cubic yards). Based on the landfill tonnage records, the design capacity also exceeds the 2.5 million megagram threshold, so the NMOC emission rate must be determined.

Action: Because it is subject to the EG, the landfill owner will have to submit the design capacity report and the initial NMOC emission rate estimate report by April 6, 2000 (40 CFR s. 62.14353). Also, since the landfill is subject to the EG and has a design capacity that exceeds 2.5 million cubic meters and 2.5 million megagrams , the owner or operator begins preparation of an Operation Permit application to be submitted to the Air Management Program by April 6, 2001.

U.S. EPA has stated in guidance that the uncontrolled (i.e., prior to flare or other control device) NMOC emission rate is calculated to determine if the emission rate exceeds 50 Mg/yr. The owner decides to use a site specific value for the NMOC concentration instead of the using the default NMOC concentration. The owner has a stack test performed using EPA Method 25C. A stack test consists of three separate runs; compliance is demonstrated by the average of the three runs. However, for calculation of a worst case emission rate, typically the highest value from the three runs is used. The actual NMOC concentration determined by the stack test is significantly less than the default concentration of 4,000 ppm. The NMOC emission rate is calculated to be less than 50 Mg/year.

Calculation for this example:

$$M_{NMOC} = 2L_o R (e^{-kc} - e^{-kt}) (C_{NMOC}) (3.6 \times 10^{-9})$$

L_o is the default methane generation potential from rule, 170 m^3/Mg

R is the average annual waste acceptance rate. For the sake of simplifying the calculations for this example, we'll assume that the actual annual waste acceptance rate is unknown. The site was open for 10 years and a total of 3.0 million Mg of waste was placed on the site. Therefore, the average waste acceptance rate is: 3,000,000 Mg/10 years, or 300,000 Mg/yr.

k is the default methane generation rate constant from rule, 0.05 yr^{-1}

t is the age of the landfill, or 10 years for this example

c is the time since closure (in years). For this example, 5 years will be used.

C_{NMOC} was determined by EPA Method 25C to be 270 ppm by volume as hexane. The test was approved by the Department. To provide a worst case value, the highest ppm value from the three stack test runs was used, rather than the average value.

$$M_{NMOC} = 2(170)(300{,}000)(e^{-(0.05)(5)} - e^{-(0.05)(10)})(270)(3.6 \times 10^{-9}) = 17.1 \text{ Mg/yr}$$

The Air Operation Permit (when issued) will include the annual (or five year) NMOC emission rate report requirement, but no other EG requirements will be applicable, unless the NMOC emission rate exceeds 50 Mg/year based on future stack test results or calculations. The owner chose to use the maximum stack test result to minimize the possibility of a future stack test (done for compliance purposes) triggering the additional EG requirements.

B. MSW Landfill subject to ch. NR 504

Scenario: Landfill B commenced construction of a 3.0 million cubic yard site on June 5, 2000. The site is a green-field site; there are no other landfills on the property.

Analysis: The landfill commenced construction after May 30, 1991 so the NSPS is the relevant regulation (rather than the EG); however, the design capacity is less than 2.5 million cubic meters (3.27 million cubic yards). Note that a gas collection and control system is required per s. NR 504.08(2), Wis. Adm. Code.

Action: To allow time for processing and the possibility of a public hearing, the landfill owner submits a Construction Permit application to the Air Management Program six months before the expected start of construction. The application includes a reference to the condition in the Plan of Operation Approval that limits the capacity to 3.0 million cubic yards and the date the Approval was issued. The landfill will be subject to the design capacity reporting requirement of the NSPS, but no other provisions of the rule.

C. Expanding MSW Landfill subject to NSPS and ch. NR 504

Scenario: Landfill C commenced construction on August 23, 1990 of a 3.0 million cubic yard landfill. There is an old, closed landfill on the same site (landfill Ca) with a design capacity of 400,000 cubic yards. The owner entered into contracts for the construction of a 2.0 million cubic yard expansion of landfill C on January 4, 2000. The actual construction of the expansion is expected to start April 1, 2000. The first phase of landfill C is closed and the gas collection and control system was installed in Phase I and in the old closed site (landfill Ca) in July of 1997 per s. NR 504.08(2), Wis. Adm. Code.

Analysis: The original construction commenced on landfill C prior to May 30, 1991 and the combined capacity of the site up to the time the expansion is commenced is 3.4 million cubic yards. The EG requirements would have applied if there were no expansion; however, the expansion triggers the NSPS for the entire site. The approved capacity for the site on January 4, 2000 is 5.4 million cubic yards. The landfill owner checks the annual tonnage reports and has determined that more than 2.5 million megagrams of waste has been placed in the site..

Action: The owner submits a Construction Permit application to Air Management for the expansion in June of 1999 to allow for processing time (approximately 6 months before commencing construction). For planning purposes, the owner has estimated future waste volumes and determined using the Tier 1 calculation and default values that the 50 Mg/year NMOC emission rate will be exceeded when the last phase of landfill C is filled in January of 2001. Rather than waiting

until the 50 Mg/yr limit is exceeded, or use the Tier 2 procedures, the owner has elected to include all of the NSPS requirements for the site in the Construction Permit application needed for the expansion. The Construction Permit application includes a description of a gas collection system for the proposed expansion and documentation that the existing gas extraction and control systems in the closed landfill and Phase I meet the NSPS requirements. The Plan of Operation Report submitted by the applicant for the expansion also included a description of the gas system proposed for the expansion. The proposed gas system will comply with ch. NR 504, Wis. Adm. Code and the NSPS.

D. Proposed new MSW Landfill subject to ch. NR 504 and NSPS

Scenario: A new, green-field landfill is proposed to be constructed in five phases. Each phase will have a design capacity of 1.6 million cubic yards. It is estimated that each phase will take 3 years to fill. For planning purposes, the owner projects annual waste volumes. Using the Tier 1 calculations from the NSPS (with default values) it is estimated that when Phase III is half filled, the NMOC emissions will exceed 50 Mg/yr.

Analysis: The landfill receives a Plan of Operation Approval and a Construction Permit prior to starting construction. The Construction Permit includes the requirement to install and test a flare to meet the requirements of the hazardous air pollutant regulations (ch. NR 445, Wis. Adm. Code). The only NSPS requirement included is the annual NMOC report. Phase I is filled and capped after 3 years, as projected. The gas collection and control system in Phase I is installed as part of the closure project.

Action: The initial stack test demonstrates compliance with the hazardous air pollutant (HAP) requirements (ch. NR 445, Wis. Adm. Code). The facility is also in compliance with all other air requirements so an Operation Permit is issued. The Operation Permit includes a condition that requires the annual NMOC emission rate calculation. Another permit condition requires the owner or operator to comply with the monitoring, reporting and recordkeeping requirements of the NSPS if the annual NMOC emission rate calculation ever exceeds 50 Mg/yr.

The initial stack test conducted to demonstrate compliance with ch. NR 445, Wis. Adm. Code, required that the owner test the inlet and outlet from the flare to determine the NMOC destruction efficiency using an approved testing procedure. The owner then uses the uncontrolled (inlet) NMOC concentration from Phase I to calculate NMOC emissions from the landfill.

The stack test required to demonstrate compliance with the hazardous air pollutant regulations is repeated every four years, as required by permit condition under the authority of s. NR 439.03(1)(a), Wis. Adm. Code. Since a stack test is already required for HAP compliance, the owner elects to confirm the inlet NMOC concentrations used for the NSPS calculation at the same time. The NMOC concentrations are revised as needed, using the highest value determined by the test runs. Using the site specific data for the annual NMOC emission rate calculation, the emission rate exceeds 50 Mg/yr during the filling of Phase V, rather than during Phase III as originally projected with default values.

VII. QUESTIONS AND ANSWERS

Q1: My landfill is subject to all portions of the NSPS and a gas collection and control system is in place. If the blower or flare shuts down, can the site vent to the atmosphere?

A1: *Only if the down time is less than 1 hour. 40 CFR s. 60.753(e) states: "In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour..." If not already in place, The owner or operator of the landfill may want to install an auto-dialer or other system to notify the operator of a blower or flare shut down.*

Q2: My landfill is now producing enough gas that I'd like to add another turbine or internal combustion engine. Do I need a separate Construction Permit to do this?

A2: *Yes, if the change you are proposing is not included in the current Construction Permit. If, for example, the Construction Permit application states that there will be one turbine installed after Phase I is closed and another after Phase III is closed, then an additional Construction Permit is not needed for the second turbine. However, if the original Construction Permit was for only one turbine, then the installation of a second turbine would require a separate Construction Permit.*

Q3: If my flare can meet the 98% NMOC reduction criterion in the Federal rules, will I also meet the presumptive LAER or BACT standards previously specified by Air Management for hazardous air contaminant control?

A3: *No. The presumptive hazardous air pollutant BACT and LAER both require at least 99% destruction of NMOC and specific design and operating requirements that are not included in the Federal rule. However, it is likely that if a flare meets the hazardous air pollutant BACT or LAER requirements that the flare will satisfy the Federal rule.*

Q4: When siting a new landfill or expanding an existing landfill, can I get stuck having to go through two hearings - one for Waste Management and one for Air Management?

A4: *Yes. The Waste Management approval procedures in s. 289.27, Stats., allow for a contested case hearing to be requested during the feasibility determination stage of the process. The Air Management Construction Permit process under s. 285.61, Stats. and the Operation Permit process under s. 285.62, Stats., both allow for a public hearing to be requested during the public comment period. Under s. 285.66, Stats., Air Management also provides an opportunity to request a public hearing during the 30 day public comment period for 5 year renewals of Operation Permits.*

Q5: Are all of the State and Federal requirements mentioned in this guidance document applicable only to municipal solid waste landfills?

A5: *The Federal EG and NSPS only apply to municipal solid waste (MSW) landfills. Some of the State requirements mentioned in this guidance also apply to other types of landfills, such as Industrial Waste and Construction and Demolition Landfills (e.g., NR 500 series design requirements, Construction and Operation Permits); however, the primary focus of this guidance is MSW landfills.*

Q6: Regarding the routine reporting required by the NSPS or EG, to whom do I submit the information - DNR, EPA, or both? Also, where should I send it within DNR or EPA?

A6: *Until the NSPS is included in the Wisconsin Administrative Code the reporting required by the regulations should be submitted to your regional DNR Air Management compliance staff and U.S. EPA Region V. Your Air permit that contains the reporting requirements will include the address of the regional DNR office. The address for EPA is:*

U.S. EPA Region V
77 W. Jackson Blvd.
Chicago, IL 60604

Until the Department receives delegation of the EG rule from EPA, EG related information should also go to EPA as well as DNR.

Q7: Does it make any difference with these State and Federal rules if my landfill is in a non-attainment area?

A7: *Possibly. A landfill located in a non-attainment area would be subject to the air regulations described in this document and could be subject to additional requirements. If more than one regulation applies, for example, the NSPS requires 98% control of NMOC and if the non-attainment lowest achievable emission rate requirement were 99.9% control, then the more stringent regulation applies.*

Q8: What authority and discretion does DNR now have in implementing the NSPS and EG? How will this change after the NSPS has been adopted into State Air Management code and DNR has been given delegation for the EG?

A8: *As of the date of this guidance, the NSPS has not been incorporated into the Wisconsin Administrative Code nor has the Federal EG plan been delegated to Wisconsin. Under this situation, the State can incorporate the NSPS requirements into permits and then enforce the requirements (s. 285.65(13), Stats.). However, the case-by-case options specifically allowed by 40 CFR s. 60.752(b)(2)(i)(B) cannot be approved by the State until the NSPS has been incorporated into the Wisconsin Administrative Code. An owner or operator would have to get approvals under this section from U.S. EPA Region V.*

After the NSPS is incorporated into the Wisconsin Administrative Code, the State can approve case-by-case options under 40 CFR s. 60.752(b)(2)(i)(B) in permits.

The effective date of the Federal EG plan is January 7, 2000. The initial reporting provisions of the EG are required to be addressed by April 6, 2000. The language of the Federal EG plan or the delegation agreement will address DNR's authority and discretion.

Q9: My landfill's design capacity is over 2.5 million megagrams and 2.5 million cubic meters, but I don't think I'm exceeding the emissions threshold of 50 megagrams per year of NMOC. How do I go about testing out of the NSPS/EG requirements?

A9: *First, you should check the applicable dates of the NSPS/EG. If the landfill's most recent construction commenced on or after the applicable dates and the design capacity is over 2.5 million megagrams and 2.5 million cubic meters, then the NMOC emission rate is needed. The calculations procedures are described in the Federal rule (40 CFR s. 60.754). The first step in the calculation (Tier 1) uses default values to estimate emissions. If the NMOC*

emission rate using Tier 1 is over 50 Mg/yr, then the owner or operator can determine site specific parameters as described under Tier 2 and Tier 3. Note that the Tier II calculation must be submitted within 180 days of the Tier I submittal and the Tier III calculation must be submitted within 1 year of the Tier I submittal (40 CFR s. 60.757(c)(1) and (2)). Since many Wisconsin MSW landfills already have gas collection and control systems installed, it may be possible to test the collected landfill gas just before the blower using an approved EPA test method to determine the NMOC concentration of the landfill gas. Note that EPA guidance indicates that only uncontrolled emission values (i.e., samples collected before any control device) are used in the applicability calculation.

Q10: Do I have to do "surface sniffing" year-round?

A10: *Yes. 40 CFR s. 60.755(c) requires quarterly surface methane monitoring. However, 40 CFR s. 60.753(d) states: "Areas with steep slopes or other dangerous areas may be excluded from surface testing." 40 CFR s. 60.753(d) also states that a plan should be developed to describe the monitoring procedure. The plan could include a provision that areas with steep slopes will not be monitored during the winter months or if the slopes are slippery. EPA would have to be contacted if an owner or operator wants additional flexibility.*

Q11: My landfill was approved several years ago and no Construction Permit was ever applied for or issued. What now?

A11: *If there is no future construction to be done at the landfill, a new Construction Permit is not needed; however, all active landfills will need an Operation Permit (unless exempt). During the review for the Operation Permit, if it is determined that a Construction Permit was required for past construction, the Air Program can include language to approve an "after-the-fact" Construction Permit with the Operation Permit. The Air Management program will evaluate each situation on a case-by-case basis to determine if additional actions are needed.*

Q12: I checked with DNR previously and was told that Construction Permits only applied to MSW landfills. This guidance indicates that all new or expanding licensed landfills need Construction Permits. Did I misunderstand what was told to me previously or did DNR change its position?

A12: *Since the promulgation of the landfill NSPS the Department has re-evaluated its position on air permit applicability for landfills. The Department now believes that all landfills should calculate their air emissions to determine if they need a permit. According to the air regulations, all sources of air emissions require a permit unless exempt. The exemption thresholds for Construction Permits are given in s. NR 406.04, Wis. Adm. Code and the exemption thresholds for Operation Permits are given in s. NR 407.03, Wis. Adm. Code.*

VIII. APPENDICES

A. NR 504, 506 and 507, Wis. Adm. Code Requirements

NR 504.04

(4) Performance Standards. No person may establish, construct, operate, maintain or permit the use of property for a landfill if there is a reasonable probability that the landfill will cause:

(e) The migration and concentration of explosive gases in any landfill structures excluding the leachate collection system or gas control or recovery system components in excess of 25% of the lower explosive limit for such gases at any time. The migration and concentration of explosive gases in the soils outside of the limits of filling within 200 feet of the landfill property boundary or beyond the landfill property boundary in excess of the lower explosive limit for such gases at any time. The migration and concentration of explosive gases in the air outside of the limits of filling within 200 feet of the landfill boundary or beyond the landfill property boundary in excess of the lower explosive limit for such gases at any time.

(f) The emission of any hazardous air contaminant exceeding the limitations for those substances contained in s. NR 445.03.

NR 504.08

(1) General. All landfills accepting wastes with the potential to generate gas shall be designed to prevent the migration of explosive gases generated by the waste fill.

(2) Active Gas Extraction and Treatment. In order to efficiently collect and combust hazardous air contaminants, all landfills which accept municipal solid waste shall be designed with an active gas recovery system. All gas recovery systems shall include the following design features, unless otherwise approved by the department:

(a) Vertical gas extraction wells shall be proposed throughout the entire landfill with a maximum radius of influence of 150 feet per well and lesser radii proposed for wells located near the perimeter of the landfill. The radii of influence of adjacent wells shall overlap. Alternate well spacings may be proposed if site specific data is obtained though performance of pump tests.

(b) All vertical gas extraction wells shall extend to 10 feet above the leachate collection system and shall be placed in 36 inch diameter boreholes. An exemption may be proposed to allow for placement of gas extraction wells closer to the leachate collection system.

(c) The pipe in the borehole shall be a minimum 6 inch diameter, Schedule 80 polyvinyl chloride or an approved alternate.

(d) The lower 2/3 to 3/4 of the pipe in the borehole shall be slotted or perforated pipe.

(e) The backfill around the slotted or perforated pipe in the borehole shall be one to 1-½ inch washed stone. The top 10 feet of the borehole shall be sealed.

Note: there is a typographical error in (e) of the Wis. Adm. Code; the intended language is used here.

(f) Each gas extraction well shall have a flow control valve and sampling access port.

(g) The gas header system shall be looped to allow alternative flow paths for the gas.

(h) The minimum slope on the header pipe shall be 2% for pipes over the waste mass.

(i) Polyethylene pipe shall be used for header and lateral pipes.

(j) The sizing of the blower, header and laterals shall ensure that a minimum vacuum of 10 inches water column is available in the header adjacent to those wells located furthest from the blower.

(k) A drip leg or equivalent shall be installed immediately before the blower to separate condensate from gas while preserving the suction at the wells while under maximum operating vacuum.

(l) All condensate transfer piping and gas transfer piping located outside of the limit of waste shall be designed to be fully encased in at least 2 feet of clay, double-cased pipe or by using another approved secondary containment method except for systems with multiple drip legs within the landfill where the bulk of the condensate has been removed.

(m) The system shall be designed to have the ability to collect and treat all condensate, measure volumes and collect samples.

(n) A flare shall be designed to meet the requirements of ch. NR 445, Wis. Adm. Code which is the hazardous air contaminant code.

(3) Gas Monitoring Wells. A minimum of one gas monitoring well shall be located on each side of the landfill.

NR 506.07

(4) Gas Control. Effective means shall be utilized to prevent the migration of explosive gases generated by the waste fill. At no time shall the concentration of explosive gases in any landfill structure, excluding the leachate collection system or gas control and recovery system components exceed 25% of the lower explosive limit for such gases. At no time shall the concentration of explosive gases in the soils outside of the limits of filling or air within 200 feet of or beyond the landfill property boundary exceed the lower explosive limit for such gases. The department may require the concentration of explosive gases not exceed detectable levels for that gas at the landfill property boundary.

NR 506.08

(6) Hazardous Air Contaminant Control. All landfills which have a design capacity of greater than 500,000 cubic yards and have accepted municipal solid waste shall install a department approved system to efficiently collect and combust hazardous air contaminants emitted by the landfill within 18 months of February 1, 1988 unless the owner can demonstrate that the performance criteria of s NR 504.04(4)(f) can be achieved without implementing such a system. Control techniques other than combustion may be approved by the department.

NR 507.22

Gas Monitoring. The department may require the owner or operator to install gas monitoring devices, to prepare and submit gas sampling and analysis programs, and to determine the effectiveness of any gas extraction system. If explosive gases are detected in any gas monitoring wells located outside the limits of filling, the department may require any or all of the following: more frequent monitoring, monitoring for pressure or other parameters, and the installation of additional gas monitoring wells which may include nests of wells screened over shorter vertical intervals. Where monitoring is required, the owner or operator shall comply with all of the following:

NR 507.24

Air monitoring. If the facility has the potential to cause air pollution as defined in s. 285.01(3), Stats., the department may require the owner or operator to monitor air quality for particulates, toxics or other constituents in the ambient air from point sources or in buildings at or associated with the facility. The department shall specify sampling times and locations and all sampling shall be implemented in accordance with plans approved by the department.

NR 507.26

(3) All other environmental monitoring results. The owner or operator shall submit sampling results and water elevation data to the department within 60 days of the end of the sampling period. An explanation of any deviation from the approved sampling plan or analytical procedures shall be submitted at the same time.

D. Electronic References

- Waste Management Code: NR 500 Series

http://www.legis.state.wi.us/rsb/code/nr/nr500.html

- Air Management Code: NR 400 Series

http://www.legis.state.wi.us/rsb/code/nr/nr400.html

- New Source Performance Standards Regulations and Emission Guidelines

  Final Rule
  http://www.epa.gov/ttn/uatw/landfill/fr12mr96.html

  Amended Final Rule
  http://www.epa.gov/ttn/uatw/landfill/fr16jn98.html

  Amended Final Rule
  http://www.epa.gov/ttn/uatw/landfill/fr24feb99.txt

- Federal Plan for Emission Guidelines

http://www.epa.gov/ttn/uatw/landfill/fr08no99.html

- Summary of the Requirements for the NSPS and EG for MSW Landfills

http://www.epa.gov/ttn/uatw/landfill/lf-vol1.pdf

- MSW Landfill NSPS and EG – Questions and Answers

http://www.epa.gov/ttn/oarpg/t1/reports/landfq_a.pdf

- Maximum Achievable Control Technology (MACT)

http://www.epa.gov/ttn/uatw/landfill/rdlandfl.html

- Compilation of Air Pollutant Emission Factors, AP-42, Volume 1: Stationary Point and Area Sources, U.S. EPA – OAQPS.

http://www.epa.gov/ttn/chief/ap42c13.html